

09/19/00

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Please type a plus sign (+) inside this box → ☐Approved for use through 09/30/2000. OMB 0651-0032  
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE  
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number**UTILITY  
PATENT APPLICATION  
TRANSMITTAL**

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No. 462-99-012

First Inventor or Application Identifier GILBERT

Title AIRCRAFT CABIN PERSONAL TELEPHONE MICROCELL

Express Mail Label No. EL447328090US

**APPLICATION ELEMENTS**

See MPEP chapter 600 concerning utility patent application contents.

**ADDRESS TO:**Assistant Commissioner for Patents  
Box Patent Application  
Washington, DC 20231

1. ☒ \*Please charge the fees indicated on the attached fee transmittal and credit overpayments or charge any and all fees due throughout the pendency of this application to Deposit Account No. 01-1125.
2. ☒ Specification [Total Pages] 29  
(preferred arrangement set forth below)
- Descriptive title of the Invention
  - Cross References to Related Applications
  - Statement Regarding Fed sponsored R & D
  - Reference to Microfiche Appendix
  - Background of the Invention
  - Brief Summary of the Invention
  - Brief Description of the Drawings (if filed)
  - Detailed Description
  - Claim(s)
  - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets] 3
4. Oath or Declaration [Total Pages] ☐
- a. ☐ Newly executed (original or copy)
- b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))  
(for continuation/divisional with Box 17 completed)  
[Note Box 5 below]
- i. ☐ **DELETION OF INVENTOR(S)**  
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference (useable if Box 4b is checked)  
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered to be part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6. ☐ Microfiche Computer Program (Appendix)
7. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
- a. ☐ Computer Readable Copy
- b. ☐ Paper Copy (identical to computer copy)
- c. ☐ Statement verifying identity of above copies

**ACCOMPANYING APPLICATION PARTS**

8. ☐ Assignment Papers (cover sheet & document(s))
9. ☐ 37 C.F.R. § 3.73(b) Statement (when there is an assignee) ☐ Power of Attorney
10. ☐ English Translation Document (if applicable)
11. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503)  
(Should be specifically itemized)
14. ☐ \* Small Entity Statement(s) filed in prior application, (PTO/SB/09-12) ☐ Status still proper and desired
15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☒ Other: UNSIGNED DECLARATION

\* A new statement is required to be entitled to pay small entity fees, except where one has been filed in a prior application and is being relied upon.

**17. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:**

☒ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: 60/157,897

Prior application information: Examiner Unknown Examiner Group / Art Unit: Unassigned

**18. CORRESPONDENCE ADDRESS**☒ Customer Number or Bar Code Label**000128**

(Insert Customer No. or Attach bar code label here)

or ☐ Correspondence address below

Name	Eric G. Halsne Honeywell International Inc.				
Address	101 Columbia Road, P. O. Box 2245				
City	Morristown	State	NJ	Zip Code	07962
Country	USA	Telephone	(425) 376-2107	Fax	(425) 885-8797

Name (Pnnt/Type)	Eric G. Halsne	Registration No. (Attorney/Agent)	46,753
Signature	<i>Eric G. Halsne</i>	Date	9/19/00

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<b>FEE TRANSMITTAL</b>		<b>Complete if Known</b>	
Patent fees are subject to annual revision on October 1. These are the fees effective October 1, 1997. Small Entity payments must be supported by a small entity statement, otherwise large entity fees must be paid. See Forms PTO/SB/09-12. See 37 C.F.R. §§ 1.27 and 1.28.		Application Number	Unknown
		Filing Date	September 18, 2000
		First Named Inventor	David Gilbert
		Examiner Name	N/A
		Group / Art Unit	N/A
		Attorney Docket No.	462-99-012
<b>TOTAL AMOUNT OF PAYMENT</b>		(\$)	1,614.00

<b>METHOD OF PAYMENT (check one)</b>		<b>FEE CALCULATION (continued)</b>																																																																																																																																																																																	
<b>1.</b> <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge indicated fees and credit any over payments to: Deposit Account Number: 01-1125 Deposit Account Name: Honeywell International Inc. <input checked="" type="checkbox"/> Charge Any Additional Fee Required Under 37 C.F.R. §§ 1.16 and 1.17 <input type="checkbox"/> Charge the Issue Fee Set in 37 C.F.R. § 1.18 at the Mailing of the Notice of Allowance		<b>3. ADDITIONAL FEES</b>																																																																																																																																																																																	
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<b>SUBMITTED BY</b>		<b>Complete (if applicable)</b>	
Typed or Printed Name	Eric G. Halsne	Reg. Number	46,753
Signature		Date	9/19/2000
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PATENT APPLICATION

AIRCRAFT COMMUNICATION FREQUENCY NOMINATION

Inventor(s):

David Gilbert  
13220 Barkley Street  
Overland Park, KS 66209  
A Citizen of the United Kingdom

Assignee:

Honeywell International Inc.  
Morristown, New Jersey

Entity:

Large

005750" 84759960

TITLE

AIRCRAFT CABIN PERSONAL TELEPHONE MICROCELL

CROSS-REFERENCE TO RELATED APPLICATION

5           This application claims the benefit of provisional application no.  
60/157,897, filed October 5, 1999.

BACKGROUND OF THE INVENTION

1. Field of the Invention

10           The present invention relates to mobile telecommunications. More  
particularly, the present invention relates to a system and method for two-way  
telecommunications using a wireless telephone on an aircraft, and even more  
particularly on an aircraft that is maneuvering under its own power, i.e., is taxiing  
on the runway or is in flight.

15           2. Description of the Related Art

Current airline practice is to allow normal personal cellphone use only  
while the aircraft is at the gate and the doors are open. The use of personal,  
wireless phones while on-board a maneuvering aircraft is typically prohibited  
20   because the radio frequency (RF) emissions from the wireless phone can interfere  
with the aircraft's systems, for example, communication systems, navigation  
systems, etc. Additionally, an aircraft in flight provides an on-board cellular  
terminal user with line of site to many cellphone base stations simultaneously,

which may overload or interfere with the ground networks if the cellphone simultaneously transmits signals to several base stations.

Conventional air-to-ground telecommunication systems, such as the Claircom AT&T Wireless system and the GTE Airfone system used on board

5 many commercial airliners in the USA and satellite communications systems used on some international airliners, require a passenger to use a telephone installed in the seatback or armrest of the aircraft to initiate a telephone call. The seatback phone connects the aircraft passenger to a ground-based radio station which in turn connects to the public switched telephone network (PSTN). The PSTN is the

10 everyday telephone network (local and long distance) infrastructure operated by telephone carriers, such as AT&T, MCI, Sprint, etc. However, the passengers are still prohibited from using the personal phone to which they are accustomed, depriving them of their normal service subscriptions and also their personal phone's features, such as speed dial and personal phone book. The passenger also

15 pays higher access fees to use the seatback phone installed in the aircraft, and it is very cumbersome, or in some cases impossible, to receive incoming calls on the seatback phones, resulting in passengers being unable to receive calls at all during the flight.

There is a need, therefore, for an improved telecommunication system that

20 will allow the use of a personal wireless telephone while on board a maneuvering aircraft.

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SUMMARY OF THE INVENTION

It is a general object of the present invention to provide a system and method for two-way telecommunications using a personal, wireless telephone on board a maneuvering aircraft.

- 5           It is another object of the present invention to provide a system and method for two-way telecommunications on board a maneuvering aircraft that allows a user to initiate and receive calls from a personal, wireless telephone.

- In accordance with the objects described above, one aspect of the present invention includes a telecommunication system having an interface device on  
10   board an aircraft that interfaces with a wireless phone of a user inside the aircraft and with a wireless bearer system, and a controller that controls the interface device to maintain RF emissions of the wireless phone below a predetermined level. The interface device receives signals from and transmits signals to the wireless phone, receives signals from and transmitting signals to the wireless  
15   bearer system, and interfaces through the wireless bearer system to a cellular network and then with a public switched telephone network to register the wireless phone as a roaming subscriber on the contacted cellular network. The predetermined level is a level above which RF emissions will interfere with aircraft systems. The telecommunication system may also include one or more of a  
20   wireless bearer system gateway on board the aircraft that converts signals received from the wireless phone to protocols of the wireless bearer system and that converts signals received from the wireless bearer system to protocols of the wireless phone, an antenna in a cabin of the aircraft that receives output signals from the wireless phone and conveys the output signals to the interface device, a

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media converter that conveys the signals between the antenna and the interface device, an RF detector that detects unwanted RF emissions above the predetermined level and unsupported cellphone types where the controller alerts crew members of the aircraft to the unwanted RF emissions and unsupported  
5 cellphone types detected by the RF detector, and an external antenna that respectively transmits and receives direct cellular signals to and from the wireless phone when the aircraft is on the ground.

In another aspect of the present invention, a telecommunication system includes means on board an aircraft for interfacing with a wireless phone of a user  
10 inside the aircraft and with a wireless bearer system, and means for controlling RF emissions of the wireless phone to maintain the RF emissions below a predetermined level above which RF emissions will interfere with aircraft systems. The means for interfacing is for receiving signals from and transmitting signals to the wireless phone, for receiving signals from and transmitting signals to the  
15 wireless bearer system, and for interfacing through the wireless bearer system to a cellular network and then with a public switched telephone network to register the wireless phone as a roaming subscriber on the contacted cellular network. The telecommunication system may also include one or more of means on board the aircraft for converting signals received from the wireless phone to protocols of the  
20 wireless bearer system and for converting signals received from the wireless bearer system to protocols of the wireless phone, means for detecting unwanted RF emissions above the predetermined level and unsupported cellphone types where the means for controlling alerts crew members of the aircraft to the unwanted RF emissions and unsupported cellphone types detected by the means for detecting,

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and means for respectively transmitting and receiving direct cellular signals to and from the wireless phone when the aircraft is on the ground.

In yet another aspect of the present invention, a method of two-way communications using a wireless phone on board an aircraft includes the steps of

5 interfacing on board the aircraft with the wireless phone of a user inside the aircraft and with a wireless bearer system, and controlling RF emissions of the wireless phone to maintain the RF emissions below a predetermined level above which RF emissions will interfere with aircraft systems. The interfacing step includes receiving signals from and transmitting signals to the wireless phone, receiving

10 signals from and transmitting signals to the wireless bearer system, and interfacing through the wireless bearer system to a cellular network and then with a public switched telephone network to register the wireless phone as a roaming subscriber on the contacted cellular network. The method may also include one or more of converting signals received from the wireless phone to protocols of the wireless

15 bearer system and converting signals received from the wireless bearer system to protocols of the wireless phone, detecting unwanted RF emissions above the predetermined level and unsupported cellphone types where the controlling step includes alerting crew members of the aircraft to the unwanted RF emissions and unsupported cellphone types detected in the detecting step, and transmitting and

20 receiving direct cellular signals to and from the wireless phone when the aircraft is on the ground.

In still another aspect of the present invention, computer executable code for implementing a method of two-way communications using a wireless phone on board an aircraft includes code for executing the steps of interfacing on board the

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aircraft with a wireless phone of a user inside the aircraft and with a wireless bearer system, and controlling RF emissions of the wireless phone to maintain the RF emissions below a predetermined level above which RF emissions will interfere with aircraft systems. The interfacing step includes receiving signals from and transmitting signals to the wireless phone, receiving signals from and transmitting signals to the wireless bearer system, and interfacing through the wireless bearer system with a cellular network and then with a public switched telephone network to register the wireless phone as a roaming subscriber on the contacted cellular network. The computer executable code may also include code for executing one or more of converting signals received from the wireless phone to protocols of the wireless bearer system and converting signals received from the wireless bearer system to protocols of the wireless phone, detecting unwanted RF emissions above the predetermined level and unsupported cellphone types where the controlling step includes alerting crew members of the aircraft to the unwanted RF emissions and unsupported cellphone types detected in the detecting step, and transmitting and receiving direct cellular signals to and from the wireless phone when the aircraft is on the ground.

In another aspect of the present invention, a method of two-way communications using a wireless phone on board an aircraft includes the steps of providing a base station on the aircraft to receive outbound signals from the wireless phone, and transmitting the outbound signals from the aircraft to a wireless bearer system for communication to a ground earth station. The method may also include one or more of receiving, by the base station, inbound signals from the wireless bearer system, transmitting the inbound signals from the base

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station to the wireless phone, interfacing, through the wireless bearer system, the base station with a cellular network and then with a public switched telephone network to register the wireless phone as a roaming subscriber on the contacted cellular network, controlling RF emissions of the wireless phone to maintain the

5 RF emissions below a predetermined level above which RF emissions will interfere with aircraft systems, converting signals received from the wireless phone to protocols of the wireless bearer system and converting signals received from the wireless bearer system to protocols of the wireless phone, detecting unwanted RF emissions above the predetermined level and unsupported cellphone types where

10 the controlling step includes alerting crew members of the aircraft to the unwanted RF emissions and unsupported cellphone types detected in the detecting step, and transmitting and receiving direct cellular signals to and from the wireless phone when the aircraft is on the ground.

These and other aspects, objects, and features of the present invention will

15 become apparent from the following detailed description of the preferred embodiments, read in conjunction with, and reference to, the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

20 Figure 1 is a block diagram showing the telecommunication system according to the present invention;

Figure 2 is a block diagram showing an embodiment of the telecommunication system according to the present invention; and

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Figure 3 is a block diagram showing a ground earth station that operates with the telecommunication system of the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

5 While the present invention applies to all personal, wireless phone use on-board an aircraft, it is particularly beneficial for use in flight, because it provides a system and method for passengers to use a personal, wireless phone to initiate and receive calls on board a maneuvering aircraft. In doing so, the present invention includes an on-board base station that interfaces between the passenger's personal  
10 phone and a Satellite Communications (SATCOM) system, thereby connecting the personal phone to the PSTN. The present invention also controls the output of the personal phone below an acceptable level, thereby preventing interference with the aircraft's systems.

A SATCOM system refers to the method of making a communications  
15 transfer by transmitting between a ground or aircraft-based mobile satellite terminal and a satellite vehicle in space. The communications signal is transferred between the satellite and a fixed ground station and between the ground station and the public voice and data networks.

Each of the elements shown in block outline in Figure 1, as well as in  
20 Figures 2 and 3, is well known per se, and a specific type of construction is not critical to carrying out the invention or to a disclosure of the best mode for carrying out the invention.

As shown in Figure 1, the system according to the present invention includes a cellular base station (including an interface device, for example, a

microcell or picocell) 104 installed on the aircraft. The base station 104 interfaces the personal, wireless phones 102 of the passengers in the aircraft's cabin with a wireless bearer system 106. The wireless bearer system 106 completes the call to or from the cellular network 108, which connects to the public switched telephone network (PSTN) 110.

In operation, the on-board base station 104, in conjunction with its computer controller (described below), interfaces with the personal phones 102 to control their power level and RF emissions and to transmit and receive signals to and from the personal phones. The on-board base station 104 also interfaces with the PSTN 110 through the wireless bearer system 106 to register the personal phones as normal roaming subscribers and to complete calls to or from the personal phones. A roaming subscriber is someone who is using a cellphone outside their normal home area and within an area serviced by a cellular service provider which is not the one with whom the subscriber has his agreement and to whom he pays charges. The home network operators typically have roaming agreements with other network operators to provide service to customers outside their home area.

The on-board base station of the present invention includes a personal wireless phone base station, for example, a microcell or picocell (described in detail below), modified to operate in the aeronautical environment. The wireless phone base station is a radio transceiver that can communicate using wireless RF radiation with user terminals within its local, limited area, i.e., it transmits RF signals to and receives RF signals from the user terminals. It may also encapsulate additional functions, such as time synchronization with user terminals, signal

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decoding and encoding, and transmission rate adaptation between a terminal interface (for example, a wireless phone), and it may also provide a beacon signal for user terminals to be able to link to the base station.

Modifications to the wireless base station are necessary to make the unit

5 rugged enough to operate in the physical environment of an airplane, i.e., so that it will meet the performance requirements in an environment of vibration, altitude, temperature, power fluctuations, etc. Typical modifications to standard commercial electronic systems for installation on an aircraft may include: 1) Additional provisions for shock mounting of components to avoid vibration and

10 gravitational forces dislodging or disconnecting them during aircraft operation; 2) Replacement or substitution of electronic components to provide more reliable operation and less susceptibility to changes in pressure, temperature, or power fluctuations; 3) Provision of additional heating and/or cooling mechanisms (fans, changed airflow, heatsinks, temperature-sensitive air heaters, etc.); 4)

15 Replacement of components and/or provision of tighter case seals, use of different sealing materials, or replacement of cables and connectors in order to a) reduce emitted and conducted radiation which could interfere with, or be susceptible to, radiation from other electronic systems on board the aircraft, b) provide waterproofing where the equipment may be subjected to liquid spills, c) reduce

20 flammability to required airworthiness standards, and d) avoid the production of harmful gases if the equipment is subjected to fire; 5) Replacement of power supply components in order to meet aircraft supply characteristics of either 28V DC or 115V AC at 400 Hertz as provided on board commercial and business aircraft; and (6) Upgrading the power supply.

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Additionally, the on-board base station is programmed to control the power level of the personal phones so that radiated emissions remain lower than a predetermined level, thereby controlling the probability of interfering with aircraft systems. The predetermined level corresponds to levels of acceptable emissions within aircraft, which are specified in Radio Technical Commission for Aeronautics, Inc. (RTCA) document DO-160D and vary for different aircraft operating conditions, aircraft types, and frequencies within the RF spectrum. The disclosure of RTCA document DO-160D is hereby incorporated by reference. The present invention controls emissions within the requirements in that document and also detects radiated emissions outside the acceptable limits.

An embodiment of the present invention illustrating details of the on-board base station 104 will be described with reference to Figure 2. An indoor antenna, or antennas, 210 in the aircraft's cabin receives signals from and transmits signals to personal phones of the passengers. The antenna is an internal, in-building type antenna, such as a conventional antenna used in a tunnel, cabled directly to a base station, and therefore does not require line-of-sight-detection from the subscriber's terminal to the wireless base station. A media converter 208, such as a coaxial cable, fiber optic cable, or the like, relays the signals between the antenna 210 and an RF repeater 204. A controller 202, including a power supply, controls the RF repeater to receive and send the signals between the antenna 210 and a microcell 214, and it performs a control function that causes the microcell 214 to minimize RF emissions from personal phones in the cabin and to maintain the power output at reasonable levels to avoid interference. The controller 202 is a computer programmed to perform the functions discussed above or to run software designed

to perform those functions. Alternatively, the controller could be a digital or analog circuit that performs those functions. An RF detector 206 detects unwanted RF emissions and unsupported cellphone types and reports to the controller 202, which alerts crew members to their presence.

5           In this embodiment, signals between the aircraft and the ground are transmitted using a SATCOM system 218 as the wireless bearer system 106 (Figure 1). A SATCOM gateway 216 on board the aircraft interfaces the SATCOM system 218 with the microcell 214. An external antenna 212 also allows direct cellular communications when RF emissions from personal phones  
10   are not hazardous to the flight, for example, when the aircraft is on the ground and is not moving under its own power. Direct cellular communications are communications direct from the user handset to a ground base station of a nearby cellular network using wireless transmission without the necessity of using the on-board microcell.

15           As shown in Figure 3, the relevant satellite ground earth stations for completing calls with the telecommunication system in the aircraft include a satellite 302, that receives signals from and transmits signals to the SATCOM system 218 (Figure 2), and a SATCOM gateway 304 that converts the signals to the correct protocols for communication between the Cellular Network Switching  
20   Center 306 and the SATCOM system 218. The signals are then transmitted to the appropriate cellular network(s). The cellular network determines the appropriate routing for the call and is connected to the PSTN, thus allowing a cellular subscriber to make calls to a fixed telephone and vice versa.

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In the ground system, the ground earth station communicates with the base station on the airplane via satellite through the SATCOM system. The SATCOM system provides a path for multiple cellular channels to be transmitted and received by the airplane. The SATCOM gateway on the ground emulates a base station to the cellular network and its switching center and converts between SATCOM protocols and the cellular network protocols of the switching center.

The gateway system of the ground earth station appears to one or more connected cellular networks as a standard base station operating as part of the relevant cellular network. It therefore converts the SATCOM protocols into cellular protocols and vice versa. The standard link between a base station and the nearest network switch center is usually implemented with a CEPT E1 or T1 digital link carrying multiplexed voice and data traffic. Voice traffic on the SATCOM bearer system is de-multiplexed, if necessary, and converted from the compressed forms used for SATCOM voice traffic to the protocols used within the cellular networks. The reverse procedure is required for voice traffic originating on the ground cellular network side of the SATCOM gateway.

The present invention meets the need for passengers to keep in touch while traveling. The on-board base station keeps their personal phones connected to the ground network as normal roaming subscribers, and the passengers can send and receive calls just like any other cellular roaming subscriber. Additionally, the passengers can use the personal phone to which they are accustomed, thereby allowing them to have full access to their phone's features, such as speed dial, phone books, voice mail, text messaging, etc. The system allows the use of personal cell phones on board an operating aircraft by controlling their RF outputs



to acceptable levels and by using antennas in the aircraft's cabin to receive signals from and transmit signals to the personal phones.

The present invention is especially useful when operating outside cellular partners' networks, because it uses a SATCOM system to communicate the signals to and from the ground. It is also appropriate for international applications.

A method according to the present invention for providing two-way telecommunications using a personal, wireless phone on board an aircraft includes the steps of providing a base station on the aircraft to receive outbound signals from the wireless phone, and transmitting the outbound signals from the aircraft to a wireless bearer system for communication to a ground earth station. The base station may control RF emissions of the personal phone to maintain the RF emissions below an acceptable level. The method may also include the steps of the base station receiving inbound signals from the wireless bearer system and transmitting the inbound signals to the wireless phone, and converting the output signals to protocols of the wireless bearer system prior to transmitting the output signals to the wireless bearer system and converting the input signals from the wireless bearer system protocols prior to transmitting the input signals to the personal phones on the aircraft.

It is preferable to use the present invention with computer hardware that performs the processing functions. As will be appreciated by those skilled in the art, the systems, methods, and procedures described herein can be embodied in a programmable computer, computer executable software, or digital circuitry. The software can be stored on computer readable media, for example, on a floppy disk, RAM, ROM, a hard disk, removable media, flash memory, memory sticks, optical

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media, magneto-optical media, CD-ROMs, etc. The digital circuitry can include integrated circuits, gate arrays, building block logic, field programmable gate arrays (FPGA), etc.

Although specific embodiments of the present invention have been  
5 described above in detail, it will be understood that this description is merely for purposes of illustration. Various modifications of, and equivalent steps corresponding to, the disclosed aspects of the preferred embodiments, in addition to those described above, may be made by those skilled in the art without departing from the spirit of the present invention defined in the following claims, the scope  
10 of which is to be accorded the broadest interpretation so as to encompass such modifications and equivalent structures.

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CLAIM:

1. A telecommunication system, comprising:  
an interface device on board an aircraft that interfaces with a wireless  
phone of a user inside the aircraft and with a wireless bearer system; and  
5 a controller that controls RF emissions of the wireless phone to maintain  
the RF emissions below a predetermined level.
2. A telecommunication system according to Claim 1, wherein the  
wireless bearer system is a SATCOM system,  
wherein said interface device receives signals from and transmits signals to  
10 the wireless phone and receives signals from and transmits signals to the  
SATCOM system, and  
wherein said controller controls said interface device to maintain the RF  
emissions of the wireless phone below a predetermined level.
3. A telecommunication system according to Claim 2, wherein said  
15 interface device also interfaces through the SATCOM system to a cellular network  
and then with a public switched telephone network to register the wireless phone as  
a roaming subscriber on the contacted cellular network.
4. A telecommunication system according to Claim 1, wherein the  
predetermined level is a level above which RF emissions will interfere with aircraft  
20 systems.
5. A telecommunication system according to Claim 2, further  
comprising:  
a SATCOM gateway on board the aircraft that converts signals received

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from the wireless phone to protocols of the SATCOM system and that converts signals received from the SATCOM system to protocols of the wireless phone.

6. A telecommunication system according to Claim 1, further comprising:

5 an antenna in a cabin of the aircraft that receives output signals from the wireless phone and conveys the output signals to said interface device.

7. A telecommunication system according to Claim 6, further comprising:

10 a media converter that conveys the signals between said antenna and said interface device.

8. A telecommunication system according to Claim 1, further comprising:

15 an RF detector that detects unwanted RF emissions above the predetermined level and unsupported cellphone types, wherein said controller alerts crew members of the aircraft to the unwanted RF emissions and unsupported cellphone types detected by said RF detector.

9. A telecommunication system according to Claim 1, further comprising:

20 an external antenna that respectively transmits and receives direct cellular signals to and from the wireless phone when the aircraft is on the ground.

10. A telecommunication system according to Claim 1, wherein said interface device is a microcell.

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11. A telecommunication system according to Claim 1, wherein said interface device is a picocell.

12. A telecommunication system, comprising:

- an interface device on board an aircraft that interfaces with a wireless  
5 phone of a user inside the aircraft and with a SATCOM system, said interface  
device receiving signals from and transmitting signals to the wireless phone,  
receiving signals from and transmitting signals to the SATCOM system, and  
interfacing through the SATCOM system to a cellular network and then with a  
public switched telephone network to register the wireless phone as a roaming  
10 subscriber on the contacted cellular network;
- a controller that controls said interface device to maintain RF emissions of  
the wireless phone below a predetermined level, the predetermined level being a  
level above which RF emissions will interfere with aircraft systems;
- a SATCOM gateway on board the aircraft that converts signals received  
15 from the wireless phone to protocols of the SATCOM system and that converts  
signals received from the SATCOM system to protocols of the wireless phone;
- an antenna in a cabin of the aircraft that receives output signals from the  
wireless phone and conveys the output signals to said interface device;
- a media converter that conveys the signals between said antenna and said  
20 interface device;
- an RF detector that detects unwanted RF emissions above the  
predetermined level and unsupported cellphone types, wherein said controller  
alerts crew members of the aircraft to the unwanted RF emissions and unsupported  
cellphone types detected by said RF detector; and

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an external antenna that respectively transmits and receives direct cellular signals to and from the wireless phone when the aircraft is on the ground.

13. A telecommunication system, comprising;

means on board an aircraft for interfacing with a wireless phone of a user  
5 inside the aircraft and with a wireless bearer system;

means for controlling RF emissions of the wireless phone to maintain the RF emissions below a predetermined level, the predetermined level being a level above which RF emissions will interfere with aircraft systems,

wherein said means for interfacing receives signals from and transmits  
10 signals to the wireless phone and receives signals from and transmits signals to the wireless bearer system.

14. A telecommunication system according to Claim 13, wherein the wireless bearer system is a SATCOM system, and

wherein said means for interfacing also interfaces through the SATCOM  
15 system to a cellular network and then with a public switched telephone network to register the wireless phone as a roaming subscriber on the contacted cellular network

15. A telecommunication system according to Claim 14, further comprising:

20 means on board the aircraft for converting signals received from the wireless phone to protocols of the SATCOM system and for converting signals received from the SATCOM system to protocols of the wireless phone.

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16. A telecommunication system according to Claim 13, further comprising:

means for detecting unwanted RF emissions above the predetermined level and unsupported cellphone types,

5 wherein said means for controlling alerts crew members of the aircraft to the unwanted RF emissions and unsupported cellphone types detected by said means for detecting.

17. A telecommunication system according to Claim 13, further comprising:

10 means for respectively transmitting and receiving direct cellular signals to and from the wireless phone when the aircraft is on the ground.

18. A telecommunication system, comprising;

means on board an aircraft for interfacing with a wireless phone of a user inside the aircraft and with a wireless bearer system, said means for interfacing for  
15 receiving signals from and transmitting signals to the wireless phone, for receiving signals from and transmitting signals to the wireless bearer system, and for interfacing through the wireless bearer system to a cellular network and then with a public switched telephone network to register the wireless phone as a roaming subscriber on the contacted cellular network;

20 means for controlling RF emissions of the wireless phone to maintain the RF emissions below a predetermined level, the predetermined level being a level above which RF emissions will interfere with aircraft systems;

means on board the aircraft for converting signals received from the wireless phone to protocols of the wireless bearer system and for converting

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signals received from the wireless bearer system to protocols of the wireless phone;

means for detecting unwanted RF emissions above the predetermined level and unsupported cellphone types, wherein said means for controlling alerts crew members of the aircraft to the unwanted RF emissions and unsupported cellphone types detected by said means for detecting; and

means for respectively transmitting and receiving direct cellular signals to and from the wireless phone when the aircraft is on the ground.

19. A method of two-way communications using a wireless phone on board an aircraft, said method comprising the steps of:

interfacing on board the aircraft with the wireless phone of a user inside the aircraft and with a wireless bearer system; and

controlling RF emissions of the wireless phone to maintain the RF emissions below a predetermined level.

20. A method according to Claim 19, wherein the wireless bearer system is a SATCOM system, and

wherein said interfacing step comprises receiving signals from and transmitting signals to the wireless phone and receiving signals from and transmitting signals to the SATCOM system.

21. A method according to Claim 19, wherein said interfacing step further comprises interfacing through the wireless bearer system to a cellular network and then with a public switched telephone network to register the wireless phone as a roaming subscriber on the contacted cellular network.

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22. A method according to Claim 19, wherein the predetermined level is a level above which RF emissions will interfere with aircraft systems.

23. A method according to Claim 20, further comprising the step of:  
converting signals received from the wireless phone to protocols of the  
5 SATCOM system and converting signals received from the SATCOM system to protocols of the wireless phone.

24. A method according to Claim 19, further comprising the step of:  
detecting unwanted RF emissions above the predetermined level and  
unsupported cellphone types,  
10 wherein said controlling step comprises alerting crew members of the aircraft to the unwanted RF emissions and unsupported cellphone types detected in said detecting step.

25. A method according to Claim 19, further comprising the step of:  
transmitting and receiving direct cellular signals to and from the wireless  
15 phone when the aircraft is on the ground.

26. A method of two-way communications using a wireless phone on board an aircraft, said method comprising the steps of:  
interfacing on board the aircraft with the wireless phone of a user inside the aircraft and with a wireless bearer system, said interfacing step comprising  
20 receiving signals from and transmitting signals to the wireless phone, receiving signals from and transmitting signals to the wireless bearer system, and interfacing through the wireless bearer system to a cellular network and then with a public switched telephone network to register the wireless phone as a roaming subscriber

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on the contacted cellular network;

controlling RF emissions of the wireless phone to maintain the RF emissions below a predetermined level, the predetermined level being a level above which RF emissions will interfere with aircraft systems;

5 converting signals received from the wireless phone to protocols of the wireless bearer system and converting signals received from the wireless bearer system to protocols of the wireless phone;

detecting unwanted RF emissions above the predetermined level and unsupported cellphone types, wherein said controlling step comprises alerting crew  
10 members of the aircraft to the unwanted RF emissions and unsupported cellphone types detected in said detecting step; and

transmitting and receiving direct cellular signals to and from the wireless phone when the aircraft is on the ground.

27. Computer executable code for implementing a method of two-way  
15 communications using a wireless phone on board an aircraft, said code for executing the steps comprising:

interfacing on board the aircraft with a wireless phone of a user inside the aircraft and with a wireless bearer system; and

controlling RF emissions of the wireless phone to maintain the RF  
20 emissions below a predetermined level.

28. Computer executable code according to Claim 27, wherein said interfacing step comprises receiving signals from and transmitting signals to the wireless phone and receiving signals from and transmitting signals to the wireless bearer system.

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29. Computer executable code according to Claim 28, wherein said  
interfacing step further comprises interfacing through the wireless bearer system  
with a cellular network and then with a public switched telephone network to  
register the wireless phone as a roaming subscriber on the contacted cellular  
5 network.

30. Computer executable code according to Claim 27, wherein the  
predetermined level is a level above which RF emissions will interfere with aircraft  
systems.

31. Computer executable code according to Claim 27, wherein the  
10 wireless bearer system is a SATCOM system, and  
said code for further executing the step of converting signals received from  
the wireless phone to protocols of the SATCOM system and converting signals  
received from the SATCOM system to protocols of the wireless phone.

32. Computer executable code according to Claim 27, said code for  
15 further executing the step of:

detecting unwanted RF emissions above the predetermined level and  
unsupported cellphone types,

wherein said controlling step comprises alerting crew members of the  
aircraft to the unwanted RF emissions and unsupported cellphone types detected in  
20 said detecting step.

33. Computer executable code according to Claim 27, said code for  
further executing the step of:

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transmitting and receiving direct cellular signals to and from the wireless phone when the aircraft is on the ground.

34. Computer executable code for implementing a method of two-way communications using a wireless phone on board an aircraft, said code for  
5 executing the steps comprising:

interfacing on board the aircraft with a wireless phone of a user inside the aircraft and with a wireless bearer system, said interfacing step comprising receiving signals from and transmitting signals to the wireless phone, receiving signals from and transmitting signals to the wireless bearer system, and interfacing  
10 through the wireless bearer system with a cellular network and then with a public switched telephone network to register the wireless phone as a roaming subscriber on the contacted cellular network;

controlling RF emissions of the wireless phone to maintain the RF emissions below a predetermined level, the predetermined level being a level  
15 above which RF emissions will interfere with aircraft systems;

converting signals received from the wireless phone to protocols of the wireless bearer system and converting signals received from the wireless bearer system to protocols of the wireless phone;

detecting unwanted RF emissions above the predetermined level and  
20 unsupported cellphone types, wherein said controlling step comprises alerting crew members of the aircraft to the unwanted RF emissions and unsupported cellphone types detected in said detecting step; and

transmitting and receiving direct cellular signals to and from the wireless phone when the aircraft is on the ground.

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35. A method of two-way communications using a wireless phone on board an aircraft, said method comprising the steps of:

providing a base station on the aircraft to receive outbound signals from the wireless phone; and

5 transmitting the outbound signals from the aircraft to a wireless bearer system for communication to a ground earth station.

36. A method according to Claim 35, further comprising the steps of:

receiving, by the base station, inbound signals from the wireless bearer system; and

10 transmitting the inbound signals from the base station to the wireless phone.

37. A method according to Claim 36, further comprising the step of:

interfacing, through the wireless bearer system, the base station with a cellular network and then with a public switched telephone network to register the  
15 wireless phone as a roaming subscriber on the contacted cellular network,

wherein the base station controls RF emissions of the wireless phone to maintain the RF emissions below a predetermined level, the predetermined level being a level above which RF emissions will interfere with aircraft systems.

38. A method according to Claim 36, further comprising the step of:

20 converting signals received from the wireless phone to protocols of the wireless bearer system and converting signals received from the wireless bearer system to protocols of the wireless phone.

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39. A method according to Claim 36, further comprising the step of:  
detecting unwanted RF emissions above the predetermined level and  
unsupported cellphone types,

wherein the base station alerts crew members of the aircraft to the  
5 unwanted RF emissions and unsupported cellphone types detected in said detecting  
step.

40. A method according to Claim 36, further comprising the step of:  
transmitting and receiving direct cellular signals to and from the wireless  
phone when the aircraft is on the ground.

10 41. A method of two-way communications using a wireless phone on  
board an aircraft, said method comprising the steps of:

providing a base station on the aircraft to receive outbound signals from the  
wireless phone;

transmitting the outbound signals from the aircraft to a wireless bearer  
15 system for communication to a ground earth station;

receiving, by the base station, inbound signals from the wireless bearer  
system;

transmitting the inbound signals from the base station to the wireless  
phone;

20 interfacing, through the wireless bearer system, the base station with a  
cellular network and then with a public switched telephone network to register the  
wireless phone as a roaming subscriber on the contacted cellular network;

controlling RF emissions of the wireless phone to maintain the RF  
emissions below a predetermined level, the predetermined level being a level

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above which RF emissions will interfere with aircraft systems;

converting signals received from the wireless phone to protocols of the wireless bearer system and converting signals received from the wireless bearer system to protocols of the wireless phone;

- 5 detecting unwanted RF emissions above the predetermined level and unsupported cellphone types, wherein said controlling step comprises alerting crew members of the aircraft to the unwanted RF emissions and unsupported cellphone types detected in said detecting step; and

- transmitting and receiving direct cellular signals to and from the wireless  
10 phone when the aircraft is on the ground.

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ABSTRACT OF THE DISCLOSURE

A telecommunication system includes an interface device on board an aircraft that interfaces with a wireless phone of a user inside the aircraft and with a wireless bearer system, and a controller that controls the interface device to

5 maintain RF emissions of the wireless phone below a predetermined level above which RF emissions will interfere with aircraft systems. The system may also include one or more of a wireless bearer system gateway on board the aircraft that converts signals received from the wireless phone to protocols of the wireless bearer system and that converts signals received from the wireless bearer system to

10 protocols of the wireless phone, an antenna in a cabin of the aircraft that receives output signals from the wireless phone and conveys the output signals to the interface device, a media converter that conveys the signals between the antenna and the interface device, an RF detector that detects unwanted RF emissions above the predetermined level and unsupported cellphone types, and an external antenna

15 that respectively transmits and receives direct cellular signals to and from the wireless phone when the aircraft is on the ground.

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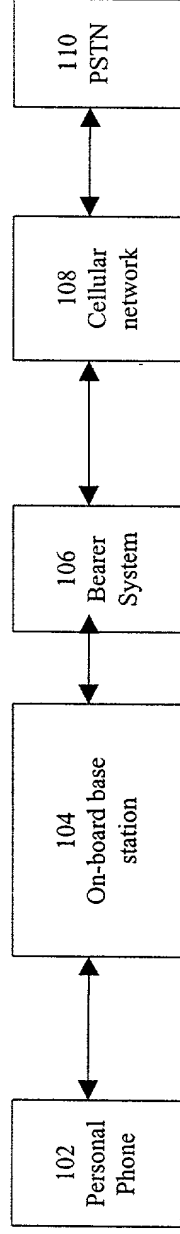


Figure 1

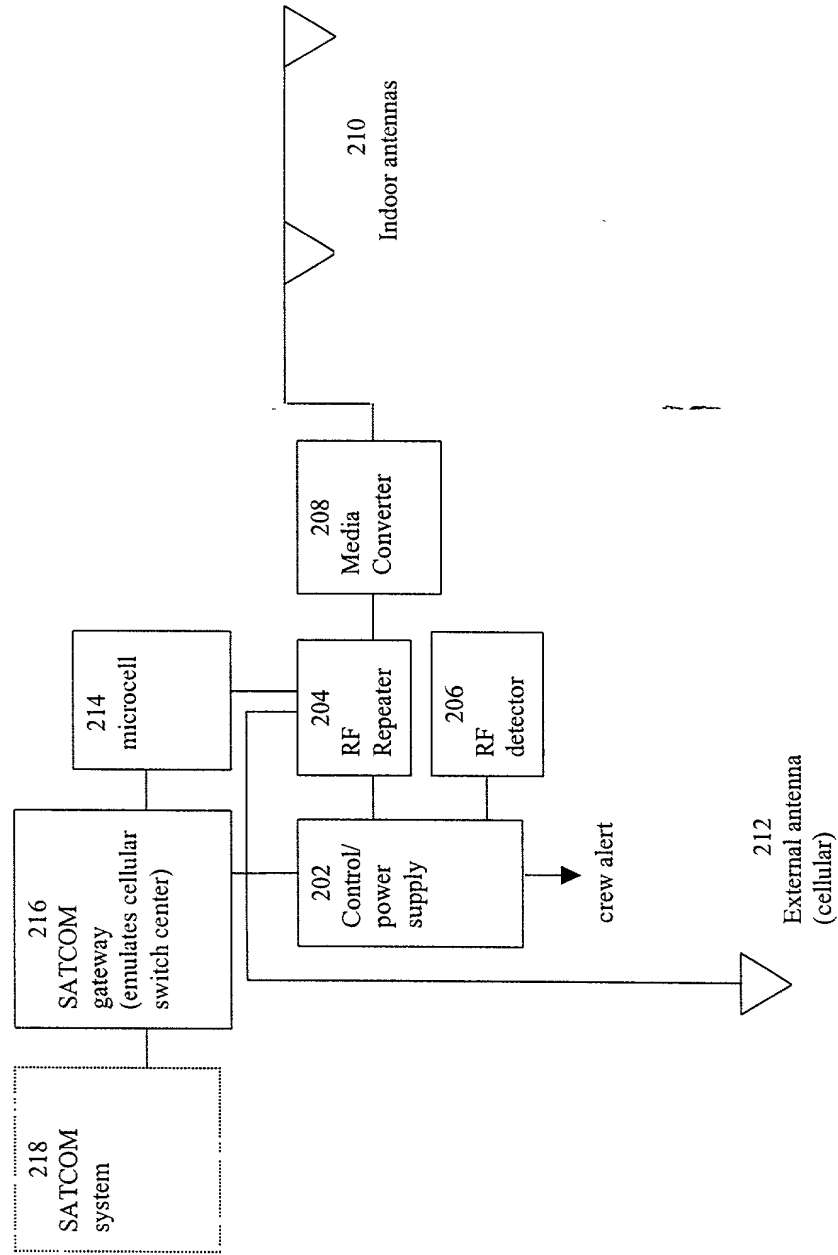


Figure 2

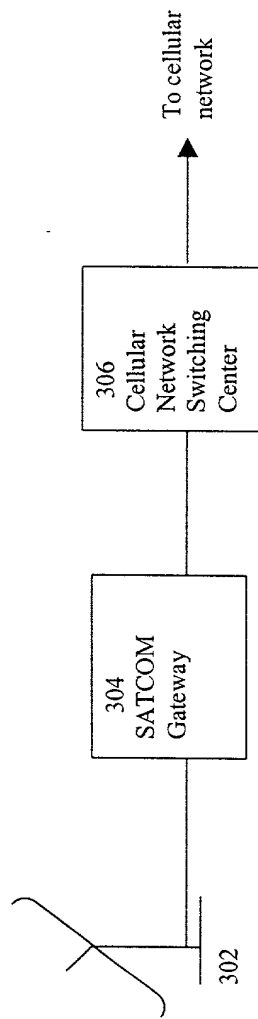


Figure 3

# DECLARATION FOR PATENT APPLICATION SOLE OR JOINT

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention titled:

## AIRCRAFT COMMUNICATION FREQUENCY NOMINATION

the specification of which is attached hereto.

I HEREBY STATE THAT I HAVE REVIEWED AND UNDERSTAND THE CONTENTS OF THE ABOVE-IDENTIFIED SPECIFICATION, INCLUDING THE CLAIMS.

I ACKNOWLEDGE THE DUTY TO DISCLOSE INFORMATION WHICH IS MATERIAL TO THE EXAMINATION OF THIS APPLICATION IN ACCORDANCE WITH TITLE 37, CODE OF FEDERAL REGULATIONS, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

### Prior Foreign Application(s)

(Number)	(Country)	(Day/Month/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(Number)	(Country)	(Day/Month/Year Filed)	<input type="checkbox"/> Yes	<input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States applications listed below and, INsofar AS THE SUBJECT MATTER OF EACH OF THE CLAIMS OF THIS APPLICATION IS NOT DISCLOSED IN THE PRIOR UNITED STATES APPLICATION IN THE MANNER PROVIDED BY THE FIRST PARAGRAPH OF TITLE 35, UNITED STATES CODE, §112, I ACKNOWLEDGE THE DUTY TO DISCLOSE MATERIAL INFORMATION AS DEFINED IN TITLE 37, CODE OF FEDERAL REGULATIONS, §1.56(a) WHICH OCCURRED BETWEEN THE FILING DATE OF THE PRIOR APPLICATION AND THE NATIONAL OR PCT INTERNATIONAL FILING DATE OF THIS APPLICATION:

60/157,897	10/05/00	Pending
(Application Serial Number)	(Filing Date)	(STATUS: Patented, Pending, Abandoned)
(Application Serial Number)	(Filing Date)	(STATUS: Patented, Pending, Abandoned)

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected herewith (List name and registration number).

(LIST SENIOR PATENT COUNSEL AND ATTORNEY HANDLING CASE WITH PATENT OFFICE REGISTRATION NUMBERS.)

Name	Loria Yeaton	Robert Desmond
Registration Number	35,063	38,430
John Donofrio	Larry Palguta	Eric G. Halsne
Name	Name	Name
32,339	29,575	46,753
Registration Number	Registration Number	Registration Number

SEND CORRESPONDENCE TO:

**Eric G. Halsne**  
Honeywell International Inc.  
P.O. Box 2245, 101 Columbia Road  
Morristown, New Jersey 07962

DIRECT TELEPHONE CALLS TO:

**Eric G. Halsne (425) 376-2107**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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FULL NAME OF SOLE OR FIRST INVENTOR David Gilbert

INVENTOR'S SIGNATURE \_\_\_\_\_ Date \_\_\_\_\_

RESIDENCE 13220 Barkley Street, Overland Park, KS 66209

CITIZENSHIP United Kingdom

POST OFFICE ADDRESS Same

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FULL NAME OF SECOND JOINT INVENTOR \_\_\_\_\_

INVENTOR'S SIGNATURE \_\_\_\_\_ Date \_\_\_\_\_

RESIDENCE \_\_\_\_\_

CITIZENSHIP \_\_\_\_\_

POST OFFICE ADDRESS \_\_\_\_\_

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FULL NAME OF THIRD JOINT INVENTOR \_\_\_\_\_

INVENTOR'S SIGNATURE \_\_\_\_\_ Date \_\_\_\_\_

RESIDENCE \_\_\_\_\_

CITIZENSHIP \_\_\_\_\_

POST OFFICE ADDRESS \_\_\_\_\_

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FULL NAME OF FOURTH JOINT INVENTOR \_\_\_\_\_

INVENTOR'S SIGNATURE \_\_\_\_\_ Date \_\_\_\_\_

RESIDENCE \_\_\_\_\_

CITIZENSHIP \_\_\_\_\_

POST OFFICE ADDRESS \_\_\_\_\_

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FULL NAME OF FIFTH JOINT INVENTOR \_\_\_\_\_

INVENTOR'S SIGNATURE \_\_\_\_\_ Date \_\_\_\_\_

RESIDENCE \_\_\_\_\_

CITIZENSHIP \_\_\_\_\_

POST OFFICE ADDRESS \_\_\_\_\_

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